



D3 Series CMTS

Outdoor JH-F3416

DOCSIS3.0



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1. Summary

All D3 CMTS series from Jinghong are developed based on DOCSIS3.0 and C-DOCSIS protocols. There are kinds of product types such as rack mount, outdoor and D-node.

D3 series adopt channel binding technology, for downstream (DS), there are 16 QAM channels which has 1.1Gbps data rate; for upstream, there are 4 QPSK/QAM channels which could reach up to 160Mbps. D3's downstream can be configured to data channels or IPQAM , for data port, there are 1000Mbps power port (RJ45) and 1000Mbps optical port (SFP), With three layer routing function, they can meet all kinds of working conditions and requirements from different operators. Due to D3's high bandwidth, perfect Qos, it is very suitable for IPTV or VOD, such kind of video service. It is cost effective for cut down cost then, add value for traditional HFC network.

There are three ways to manage D3:

- CLI after log in via serial port or by telnet;
- Remote log in embed web NMS;
- External NMS server based on SNMP protocols which run windows OS.

D3 series can compatible with DOCSIS3.0/2.0 cable modem.

JH-F3416 is the outdoor CMTS of D3 series, it is tailor made for those networks which deploy CMTS on optical nodes, it can be installed in simple machine room, sharing box even wall hanging. It has all core D3 functions and high performance, added more RF port in order to connect current optical equipment.

It is Chassis cooling mode, no fan rain-proof design, mute operation. The data port can connect upward to Ethernet and EPON. As to RF port, there are 4 TV IN for connecting TV signals from the optical receiver while other 4 RF OUT for connecting coaxial cable network.

The Outdoor CMTS forward lead the data signal and tv signal mixture from the machine room to optical node, narrowed the upstream funnel and reduced the noise interference accordingly. It can rapidly cover and connect all users without reconstructing original optical network structure.

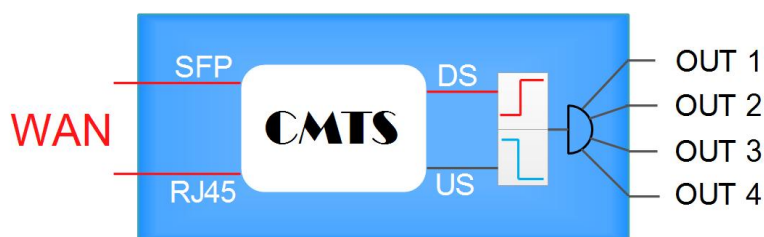
2. Block Diagram & Pictures

1) Functional Block Diagram

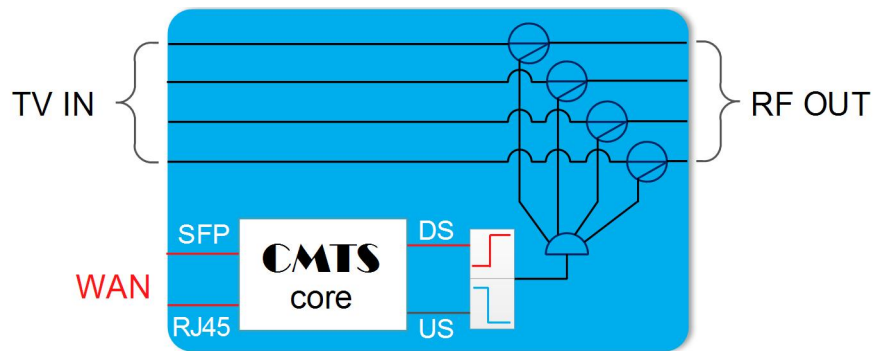
① TYPE I : Independent DS/US Ports



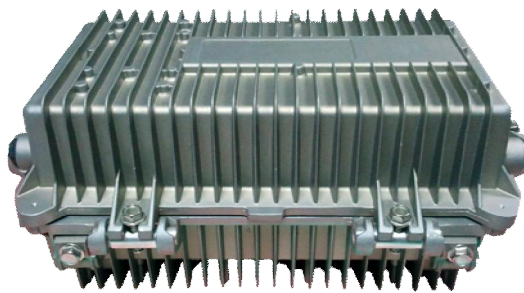
② TYPE II : Combined 4/2 Output Ports



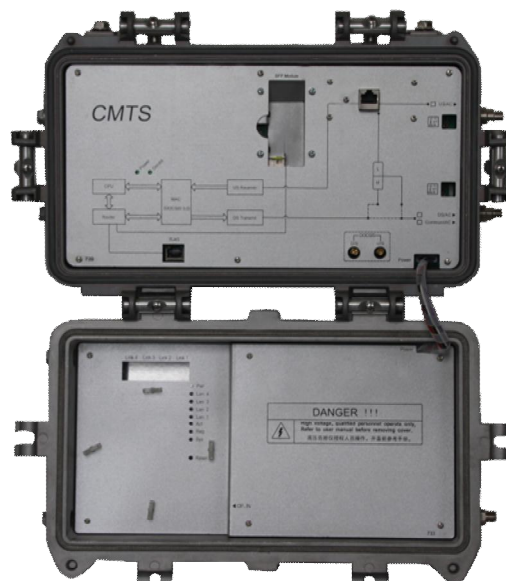
③ TYPE III: 4 Input & 4 Output Ports



2) Appearances



3) External Structure



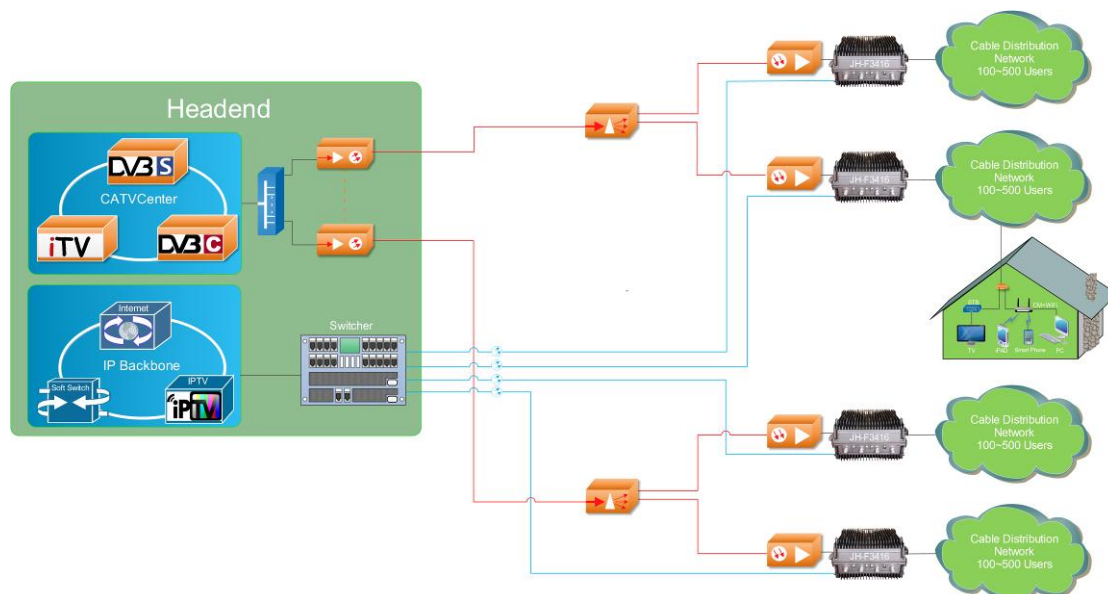
3. Features

- Compatible with DOCSIS3.0, C-DOCSIS standard, work with all cable modem based on DOCSIS, support both EURO DOCSIS and DOCSIS.
- 16 DS channels bound, 64/256/1024QAM modulation mode optional. Data rate could reach up to 1.1Gbps@1024QAM.
- 4 US channels bound, could be configured to QPSK, 3-8 grade QAM mode, data rate could reach up to 160Mbps.

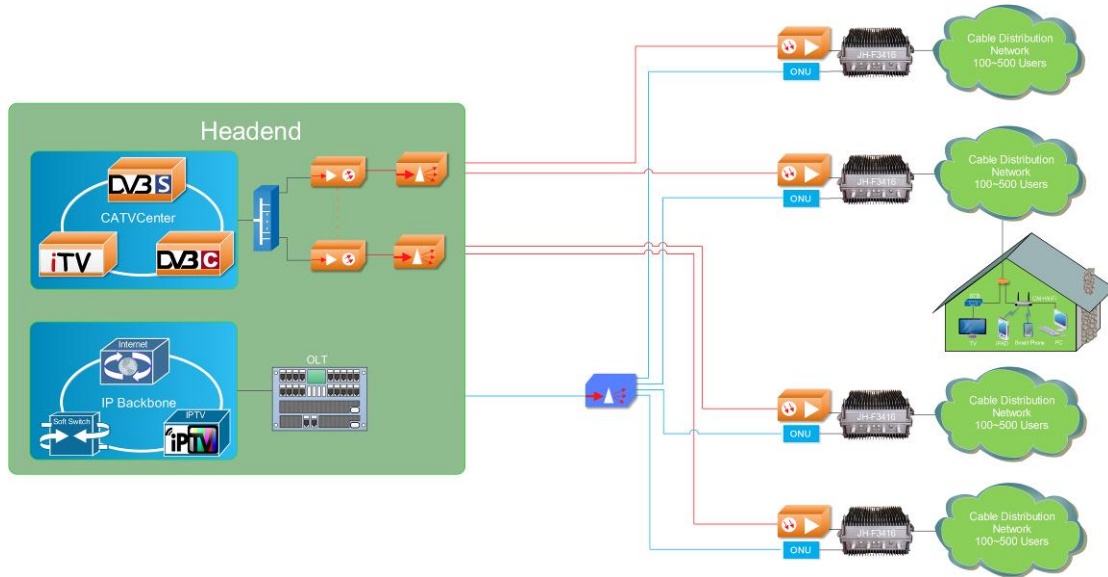
- Flexible on channels bound quantity set for convenient use of channel resource
- Layer 3 routing functions, support static route, VLAN and DHCP relay agent
- There are 1000M RJ45 port and SFP on data port which could be connected to not only EPON's ONU but also Ethernet via optical port
- There are a variety of RF interfaces which could be adapted to all kinds of optical nodes connection.
- Built-in DHCP/TFTP server, support PPPoE.
- Load balancing.
- Support IPV6, IP multicast.
- Qos based on service flow ensures bandwidth needs for various services.
- Ensure network transmit safety via various kinds of methods such as BPI+, CM identification, anti-DOS attack , user isolation and IP source checking .
- Real time upstream spectral analysis function which helps to check US channel signal and noise status.
- Support three management ways: CLI after log in via serial port or by telnet; Remote log in embed web NMS; External NMS server based on SNMP protocols which run windows OS.

4. Typical Application

1) HFC+Ethernet Application



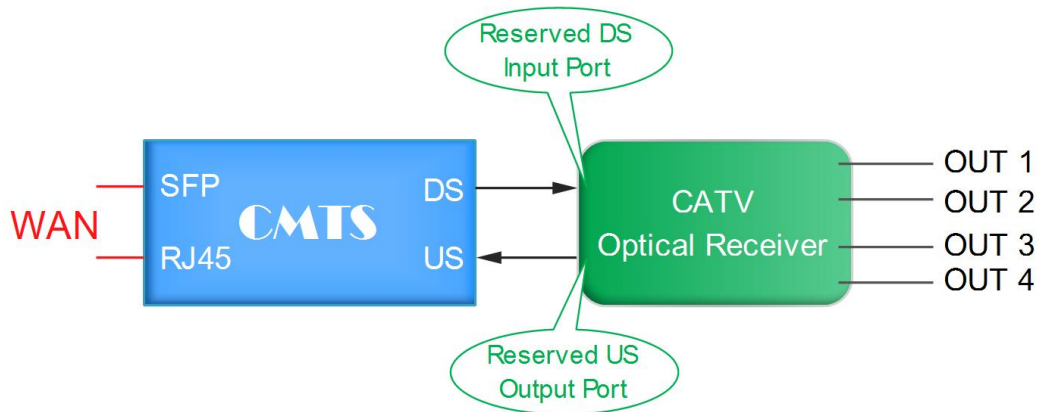
2) HFC+EPON Application



5. Several Connection Ways of Outdoor CMTS on Optical Node

1) Type I

Independent DS/US Ports



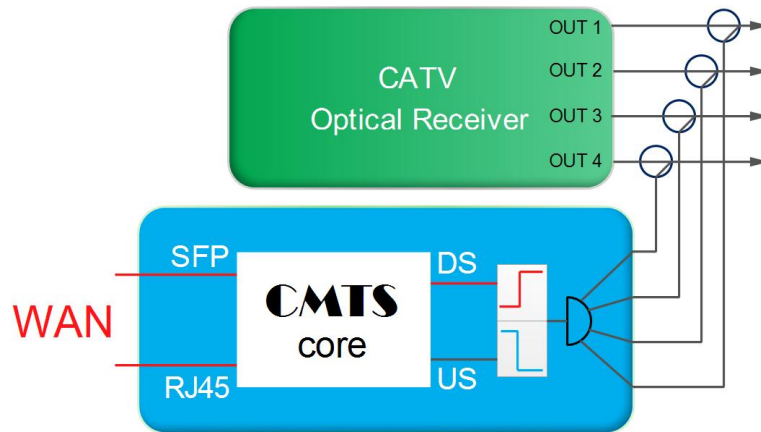
This mode is suitable for having optical receiver(or the light station) of reserving descending input port and uplink output port.

Advantage: the least cable change, the minimum cost, no affection on output level.

Disadvantage: for the requirements of the optical receiver or the light station.

2) Type II

Combined 4/2 Output Ports Type



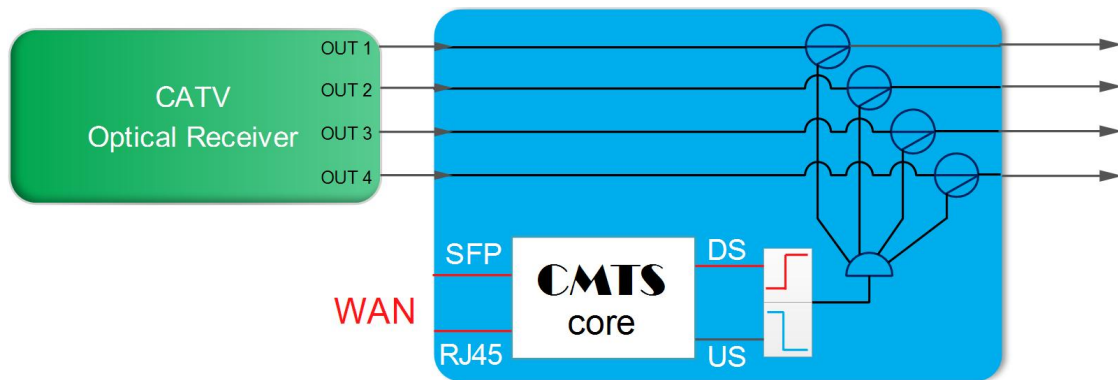
It's suitable to retain the original optical receiver, but there is no reserving upstream and downstream port.

Advantage: retain the original optical receiver, but do not waste existing resources.

Disadvantage: the cable change a lot, so that bring the insertion loss of 1-4dB for output level.

3) Type III

4 Input & 4 Output Ports



Smile the type II , but the cable connection is simpler, more intuitive, less change.

6. Specification

DOCSIS Parameter		Downstream		Upstream				
		Euro DOCSIS	DOCSIS					
Modulation Mode		64QAM/256QAM/1024QAM		256QAM/64QAM/32QAM/16QAM/8QAM/QPSK				
Frequency range (MHz)		88~1000 adjustable	88~1000 adjustable	5~65/42(optional)				
Single channel bandwidth (MHz)		8	6	Single channel bandwidth (MHz)	6.4	3.2	1.6	
Binding channel quantity		16		4				
Max.total data bandwidth (Mbps)		1000	857	160				
Single channel data rate (Mbps)	64QAM	41	27	Single channel data rate (Mbps)	256QAM	40.96	20.48	10.24
					128QAM	35.84	17.92	8.96
256QAM		55	38		64QAM	30.72	15.36	7.68
					32QAM	25.60	12.80	6.40
Output level (dBmV)		10~60 adjustable 1dB Stepping			16QAM	20.48	10.24	5.12
					8QAM	15.36	7.68	3.84
					QPSK	10.24	5.12	2.56
				Receiving Level (dBmV)		-13~+23	-13~+23	-13~+23
Single channel baud rate (Msyms)	64QAM	6.952	5.056941	Single channel baud rate (Msyms)	5.12	2.56	1.28	
	256QAM	6.952	5.360537					
Supported protocols		Euro-DOCSIS/DOCSIS3.0/2.0, TCP/IP, ARP, RIPv2, ICMP, VLAN, multicast, OSPF, DHCP, TFTP, SNMP, PPPoE, DHCP relay agent, Telnet,etc.						
RF Port Parameter		Number of RF Ports	Level(dBmV)		Insert Loss(dB)		Remarks	
			US	DS	US	DS		
Independent DS/US Ports Type		2	0	64	/	/	DS=64@single channel maximum output	
Combined 4/2 Output Ports Type		4	8	56	/	/		
4 Input & 4 Output Ports Type		8	18	45	/	1.5		
Flatness(dB)		±1.0						
Impedance(Ω)		75						
Return Loss(dB)		> 14						

Miscellaneous			
IP Interface	1000M SFP (SC/APC)	Power Supply	AC60V/220V
	1000M RJ45	Power Consumption	< 48W
RF Ports	F-Type (Metric)	Net Weight	8Kg
Console Interface	COM (RJ45)	Environment	Temperature-20~55℃; Humidity10~<90%
Protection Levels	IP65	Size(LxWxH)	410x250x170mm

7. Order Information

No.	Name	Model	Description	Remarks
1	Type I	JH-F3146- I	Independent DS/US Ports	Pls confirm power supply type before order: AC220V or AC60V by Coaxial Cable
2	Type II	JH-F3146- II	Combined 4/2 Output Ports Type	
3	Type III	JH-F3146-III	4 Input & 4 Output Ports	
4	Fiber transceiver	SFP	Customizable	

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